

Tic Tac Toe Application Documentation

1. Title and Introduction

Tic Tac Toe is a classic two-player logic game. In this version one player competes against the computer which follows a simple strategy of winning, blocking the opponent or making a random move. The program is written in Java and uses the console as the user interface.

2. Project Structure

The project is organized as follows:

```
tic-tac-toe/
├── src/
│   └── tic_tac_toe/
│       ├── Board.java
│       ├── Game.java
│       └── Main.java
└── out/ (folder created after compilation)
```

- **src/tic_tac_toe/** – folder containing all Java source files.
- **out/** – folder where `.class` files are stored after compilation.

Class Descriptions:

- **Main.java** – the entry point of the application which starts the game.
- **Board.java** – handles the game board including initialization, displaying, validating moves and detecting victory or draw conditions.
- **Game.java** – manages the gameplay logic, handling player and computer turns and the main game loop.

3. Running Instructions

To run the game follow these steps:

1. Compilation:

In the root project directory run the following command to compile the source files:

```
javac -d out src/tic_tac_toe/*.java
```

This command will compile all source files in the `src/tic_tac_toe/` folder and store the `.class` files in the `out` folder.

2. Running the Game:

After compilation, run the game using the following command:

```
java -cp out tic_tac_toe.Main
```

This command will launch the application using the `out` folder as the classpath and running the `Main` class from the `tic_tac_toe` package.

4. Game Rules

1. The game is played on a 3x3 grid.
2. The player makes moves as X and the computer plays as O.
3. The first player to align three of their symbols in a row, column or diagonal wins.
4. If the board is filled without a winner the game results in a draw.

5. Functionality Overview

- **Gameplay with the computer:** The player and the computer take turns making moves.
- **Move validation:** The program checks if the move is valid and available.
- **Victory/Draw detection:** Automatically detects when the game ends.
- **Computer strategy:** The computer makes decisions based on winning, blocking the player, or selecting a random move.

6. Code Structure

- **Package:** `tic_tac_toe`
- **Files:**
 - **Main.java:** The entry point of the program which starts the game.
 - **Board.java:** Manages the game board including initialization, displaying, move validation and victory or draw detection.
 - **Game.java:** Manages the gameplay handling player and computer moves as well as the main game loop.

7. Computer Algorithm

The computer selects its move according to the following rules:

1. **Checks if it can win this turn:** Tries all possible moves to see if any lead to a victory.
2. **Blocks the player:** If the player could win on the next turn the computer blocks that move.
3. **Makes a random move:** If neither of the above scenarios applies the computer randomly selects an empty cell.

8. User Instructions

1. After launching the program the board will be displayed in the console.
2. The player will be prompted to enter the row and column of their move (values from 0 to 2).
3. The program alternates turns between the player and the computer updating and displaying the board after each move.
4. The game ends when one of the players wins or when the board is filled displaying the result.